

### GENERAL DESCRIPTION

The SGM4558 is used for power conversion and level translation of the signal in the application of SIMs for mobile phones. Also, it can be used for the applications of 1.8V or 3.3V SIMs, which is powered by its internal LDOs from 2.7V to 5.5V input signal. The value of the output voltage can be controlled with the voltage selection pins of the SGM4558 with the maximum load current of 250mA. The function of the channel selection pins is that it can be used to determine the open condition of the specific channel. The two SIM cards can be powered by the SGM4558 at once with the control of the enable pins for each channel, and the fast translation can be made from channel A to channel B.

The level translator integrated on the SGM4558 can boost the input signal which is powered by 1.4V to 1.8V or 3V interface. If the supply voltage is below 3.3V, the lifespan of the battery can be enhanced as the 90µA operating current and 2µA shutdown current.

The SGM4558 is available in a Green TQFN-3×3-20L package. It operates over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **Controlling of Two SIM or Smart Cards with the Internal Power Management**
- **Both Connected Cards are Powered by the 1.8V/3.3V Power Supply**
- **Two LDOs Support up to 250mA Loading**
- **Powering Two SIM or Smart Cards at the Same Time**
- **Quick Switching from One Channel to Another**
- **Automatic Level Translation**
- **Fast Rising Time for the Signals**
- **Protecting Mechanism for Any Fault Conditions**
- **Mechanism which can Activate/Deactivate the Sequence**
- **Extreme Low Supply Voltage and Shutdown Current**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green TQFN-3×3-20L Package**

### APPLICATIONS

Multiple SIM Card Interfaces  
 TD-SCDMA, GSM and Other 3G<sup>+</sup> Mobile Phones  
 Wireless Point-of-Sale Terminals

### TYPICAL APPLICATION

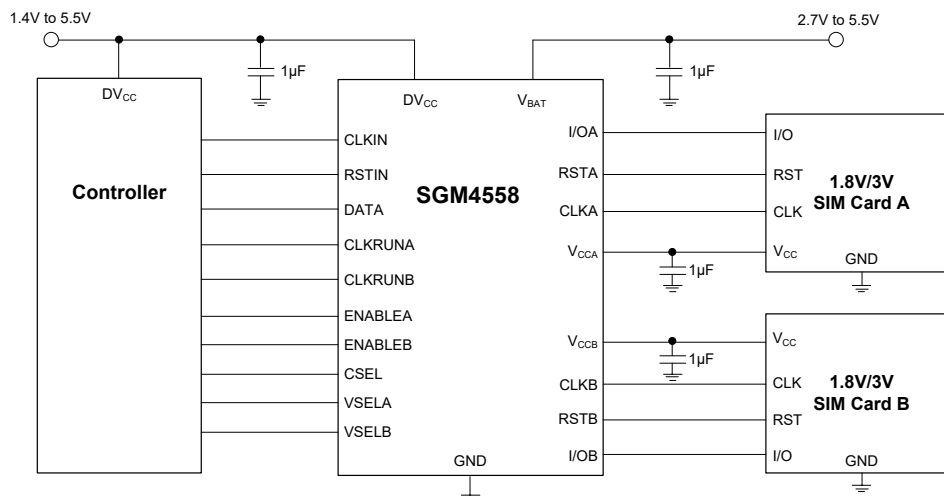


Figure 1. Typical Application Circuit

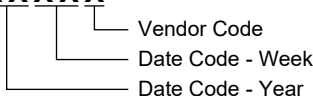
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4560	TQFN-3x3-20L	-40°C to +85°C	SGM4558YTQG20G/TR	SGM 4558QG XXXXX	Tape and Reel, 3000

**MARKING INFORMATION**

NOTE: XXXXX = Date Code and Vendor Code.

**XXXXX**



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

**ABSOLUTE MAXIMUM RATINGS**

Voltage Range (with Respect to GND)

$V_{BAT}$ ,  $DV_{CC}$ ,  $RSTIN$ ,  $CLKIN$ ,  $CLKRUNA$ ,  $CLKRUNB$ ,  
 $ENABLEA$ ,  $ENABLEB$ ,  $CSEL$ ,  $VSELA$ ,  $VSELB$

..... -0.3V to 6V

$V_{CCA}$ ,  $V_{CCB}$  ..... -0.3V to  $V_{BAT} + 0.3V$

DATA ..... -0.3V to  $DV_{CC} + 0.3V$

I/OA, CLKA, RSTA ..... -0.3V to  $V_{CCA} + 0.3V$

I/OB, CLKB, RSTB ..... -0.3V to  $V_{CCB} + 0.3V$

Package Thermal Resistance

TQFN-3x3-20L,  $\theta_{JA}$  ..... 95°C/W

Junction Temperature ..... +150°C

Storage Temperature Range ..... -65°C to +150°C

Lead Temperature (Soldering, 10s) ..... +260°C

ESD Susceptibility

HBM ..... 4000V

MM ..... 300V

**RECOMMENDED OPERATING CONDITIONS**

Operating Temperature Range ..... -40°C to +85°C

**OVERSTRESS CAUTION**

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

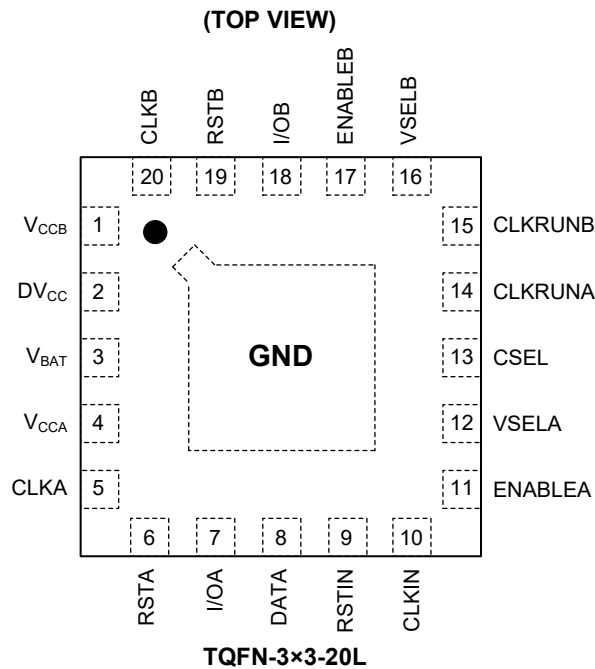
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

## PIN CONFIGURATION



## PIN DESCRIPTION

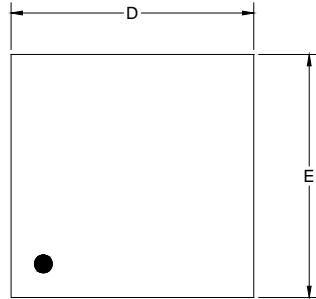
PIN	NAME	FUNCTION
1, 4	V <sub>CCB</sub> , V <sub>CCA</sub>	Card Socket. Both V <sub>CCA</sub> and V <sub>CCB</sub> pins should be connected to the power supply pin of the SIM cards respectively. Also, the voltage of V <sub>CCA</sub> /V <sub>CCB</sub> which is controlled by the enable pin of the SGM4558 can be set to 1.8V or 3V.
2	DV <sub>CC</sub>	Control Logic Reference Supply Voltage.
3	V <sub>BAT</sub>	Analog Supply Voltage.
5, 20	CLKA, CLKB	Card Socket. Both CLKA and CLKB pins of the SGM4558 should be connected to the card socket of the SIM cards respectively. Also, these two pins are derived by the CLKIN, which can be level shifted. If V <sub>CCA</sub> and V <sub>CCB</sub> obtain its corrected values, both CLKA and CLKB will start to operate with the connected SIM cards. The pin will be low or left active through CLKRUNA, CLKRUNB pins if the card socket is not detected by the SGM4558.
6, 19	RSTA, RSTB	Card Socket. These two pins are used to be connected to the RST pins of the card socket respectively. Also, these two pins are derived by the RSTIN pin. The RST pin is selected successfully if the card is selected. If V <sub>CCA</sub> and V <sub>CCB</sub> obtain its corrected values, both RSTA and RSTB will start to operate with the connected SIM cards. However, the RST pin is latched at the current state if deselecting the card socket.
7, 18	I/OA, I/OB	Card Socket. These two pins should be connected to the associated pins of the card socket. When the SIM card is selected, the I/O pins of the SGM4558 can transmit or receive the information from the DATA pin. If V <sub>CCA</sub> and V <sub>CCB</sub> obtain its corrected values, both I/OA and I/OB will start to operate with the connected SIM cards.
8	DATA	Microcontroller Side Bidirectional Data Input/Output Pin. The DATA pin can select a card at a time. There is a weak current source integrated inside the pin. Therefore, the output of the controller can be open-drain and it remains high state during shutdown mode, while DV <sub>CC</sub> must be operated during the progress.
9	RSTIN	Reset Input Pin. The signal is transmitted directly to the selected SIM card.

**PIN DESCRIPTION (continued)**

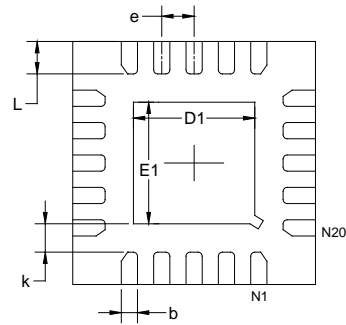
PIN	NAME	FUNCTION
10	CLKIN	Clock Input Pin. The clock signal is sent to the CLK pin of the selected SIM card. The CLKA/CLKB pin will receive the clock signal if the voltage level of CLKRUNA/CLKRUNB is in high state.
11, 17	ENABLEA, ENABLEB	Enable Input Pins. These two pins can be used to enable or disable the selected card socket.
12, 16	VSELA, VSELB	Select Input Pins. These two pins can be used to select the supply voltage level of the connected SIM cards. Setting it to a high state will provide a 3V power supply to respective SIM card. Setting it to a low state will provide 1.8V to respective SIM card.
13	CSEL	SIM/Smart Card Select Input Pin. It depends on which is the activated SIM/Smart card.
14, 15	CLKRUNA, CLKRUNB	Clock Run Input Pins. These two pins are used to determine whether the clock signal always transmits to the enabled SIM card or be controlled by the selected CSEL.
Exposed Pad	GND	Ground. Tie externally to a PCB ground plane.

PACKAGE OUTLINE DIMENSIONS

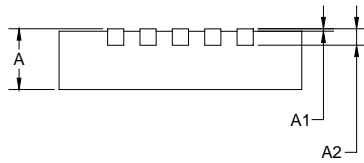
TQFN-3x3-20L



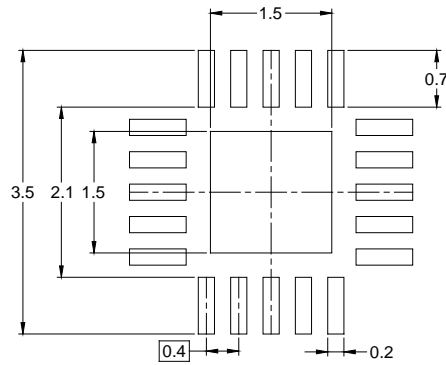
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	2.924	3.076	0.115	0.121
D1	1.400	1.600	0.055	0.063
E	2.924	3.076	0.115	0.121
E1	1.400	1.600	0.055	0.063
k	0.200 MIN		0.008 MIN	
b	0.150	0.250	0.006	0.010
e	0.400 TYP		0.016 TYP	
L	0.324	0.476	0.013	0.019

NOTE: This drawing is subject to change without notice.

# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TQFN-3×3-20L	13"	12.4	3.30	3.30	1.10	4.0	8.0	2.0	12.0	Q1

000001

# PACKAGE INFORMATION

## CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5

DD0002